



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,880	11/13/2001	Junichi Shinohara	215837US2	6153

22850 7590 09/12/2005

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

YE, LIN

ART UNIT	PAPER NUMBER
----------	--------------

2615

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/986,880

Applicant(s)

SHINOHARA ET AL.

Examiner

Lin Ye

Art Unit

2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-70 is/are pending in the application.
- 4a) Of the above claim(s) 18-62, 64-66 and 68-70 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 63 and 67 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments of Election/Restrictions

1. Applicant's election with traverse the species of Figure 2, and identify claims 1-17, 63, and 67 as readable on the elected species filed on 7/08/05 is acknowledged. The traversal is on the ground(s) that applicants believe that a search and examination of the entire application would not place a serious burden on the Examiner. This is not found persuasive because the examiner made a *prima facie* showing of examining burden by pointing out the distinct species. For examples, Figure 2 which does not include the step S13 for judging a failure of pixel shift unit as shown in Figure 17; which does not include the step S32 for executing self calibration mode to calculate optimum adjustment value as shown in Figure 19; and which does not include the steps S51 and S59 for judging an instructions start pixel shift photographing or a continuous pixel shift photographing as shown in Figure 26. This same reason could be performed for all of the species. See MPEP 806.05(d).
2. Claims 18-62, 64-66 and 68-70 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Species Figure 17; Figure 19; Figure 26, there being no allowable generic or linking claim. Applicants timely traversed the restriction (election) requirement filed on 7/08/05.
3. **The Election/Restrictions requirement is still deemed proper and is therefore made Final.**

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-7, 9-13, 63 and 67 are rejected under 35 U.S.C. 102(b) as being anticipated by Okada et al. J.P. Patent Publication 10-056595.

Referring to claim 1, the Okada reference discloses in Figures 1, 3, 5, 11 and 13, an image input unit capable of performing pixel shift photography, said image input unit comprising: a photographic optical system (2, see paragraph [0037]) which forms an image of a subject in a predetermined position; an image sensing unit (5, see paragraph [0038]) which generates image data corresponding to the image of the subject; a pixel shift mechanism (X-axis image shift device 3 and Y-axis image shift device 4, see paragraph [0040]) which displaces said image sensing unit by a predetermined amount; a pixel shift mechanism control unit (control circuit 8, see paragraph [0047]) which controls said pixel shift mechanism so as to displace said image sensing unit by the predetermined amount (e.g., $X_r=1/2P_x$, $Y_r=1/2P_y$); an image combining unit (image composition circuit 6, see paragraph [0041]) which generates image data for one image (synthetic image) by combining the image data for a plurality of images output before (e.g. image A) and after (e.g., image B) the displacement of said image sensing unit as shown in Figures 18-20 (see paragraph [0010]); and a judgment unit which judges whether the pixel shift photography has been normally performed or not, based on the image data for a plurality of images output before and after

the displacement of said image sensing unit (e.g., blurring detection circuit 9 and judgment circuit 10 as a judgment unit for judges whether for the amount of blurring is great than a predetermined value during the pixel shift operation, for example, if no blurring or amount blurring less than the predetermined amount considered as the pixel shift photography has been normally performed, and if amount blurring great than the predetermined amount considered as the pixel shift photography has not been normally performed, see paragraph [0084]; and amount blurring detection based on the image data for a plurality of images output before and after the displacement of said image sensing unit, see paragraph [0097]).

Referring to claim 2, the Okada reference discloses wherein said judgment unit comprises: a pixel shift evaluation value calculation unit (amount detection equipment 9) which calculates a pixel shift evaluation value for judging whether the pixel shift photography has been normally performed or not (e.g., whether or not blurring arise in photography, see paragraph [0050]-[0051]), based on the image data for a plurality of images output before (e.g., image A) and after (e.g. image B) the displacement of said image sensing unit (See Paragraph [0097]); and a pixel shift photography judgment unit (judgment circuit 10) which judges whether the pixel shift photography has been normally performed or not, based on the pixel shift evaluation value calculated by said pixel shift evaluation value calculation unit as shown in Figure 13.

Referring to claim 3, the Okada reference discloses wherein said pixel shift evaluation value calculation unit calculates an amount of shift between the image data for the plurality of images output before and after the displacement of said image sensing unit (e.g., amount motion vector between image A and image B, see paragraph [0097]), as the pixel shift

evaluation value; and said pixel shift photography judgment unit judges whether the pixel shift photography has been performed normally, based on the amount of shift calculated by said pixel shift evaluation value calculation unit as shown in Figures 3 and 13 (see paragraph [0098]-[0099]).

Referring to claim 4, the Okada reference discloses wherein when calculating the amount of shift between the image data for the plurality of images, said pixel shift evaluation value calculation unit calculates each amount of shift (e.g., $X=X_r+dx$ and $Y=Y_r+dy$) for a plurality of areas of the image data as shown in Figure 4.

Referring to claim 5, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally when a part of or the whole of the amount of shift in the plurality of areas calculated by said pixel shift evaluation value calculation unit is within a predetermined range as shown in Figure 13 (e.g., whether or not the amount of blurring is great than a predetermined value, see paragraph [0085]).

Referring to claim 6, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has not been performed normally when a part of or the whole of the amount of shift in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range (when the amount of blurring is great than a predetermined value, $dx>1/10P_x$, or $dy>1/10P_y$) and there is a predetermined relation in the amount of shift in the plurality of areas as shown in Figure 13 (see paragraph [0103]).

Referring to claim 7, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally, but a part of the subject has moved (e.g., the image subject has moved by an unstable vibration as blurring), in the case where a part of or the whole of the amount of shift in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range, but there is no predetermined relation in the amount of shift in the plurality of areas as shown in Figure 13, steps S33-S34.

Referring to claim 9, the Okada reference discloses wherein said pixel shift evaluation value calculation unit calculates the coincidence degree (by using point matching method is considered as calculating the coincidence degree for detecting amount of blurring, see paragraph [0097]) for a target image data, based on an image data output by said image sensing unit before and after being displaced, as the pixel shift evaluation value; and said pixel shift photography judgment unit judges whether the pixel shift photography has been performed normally, based on the coincidence degree calculated by said pixel shift evaluation value calculation unit as shown in Figure 13.

Referring to claim 10, the Okada reference discloses wherein said pixel shift evaluation value calculation unit calculates the coincidence degree, respectively, for the plurality of areas (each pixels in the image plane) of the image data, at the time of calculating the coincidence degree as shown in Figures 18-20.

Referring to claim 11, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally when a part of or the whole of the coincidence degree (pint matching) in the plurality of areas

calculated by said pixel shift evaluation value calculation unit (9) is within a predetermined range ($1/10P_x$, or $1/10P_y$, see paragraph [0103]-[0106]).

Referring to claim 12, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has not been performed normally when a part of or the whole of the coincidence degree (point matching for calculating the amount of motion vectors) in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range, and there is a predetermined relation in the coincidence degree in the plurality of areas as shown in Figure 13.

Referring to claim 13, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally, but a part of the subject has moved (e.g., the image subject has been moved by an unstable vibration as blurring), in the case where a part of or the whole of the coincidence degree (point matching for calculating the amount of motion vectors) in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range, but there is no predetermined relation in the coincidence degree in the plurality of areas as shown in Figure 13, steps S33-S34.

Referring to claim 63, the Okada reference discloses all subject matter as discussed with respected same comments to claim 1.

Referring to claim 67, the Okada reference discloses all subject matter as discussed with respected same comments to claim 1.

Art Unit: 2615

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8, 14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. J.P. Patent Publication 10-056595 in view of Kondo et al. U.S. Patent 5,731,849.

Referring to claim 8, the Okada reference discloses all subject matter as discussed with respect to claims 1-4, and the Okada reference discloses the judgment unit (10) judges whether the pixels shift photograph has been performed normally, based on the amount of shift in the plurality of areas and the motion vector. However, the Okada reference does not explicitly has a detail about the amount of the motion vectors related to the reliability evaluation data for indicating the reliability of each amount of shift in the plurality of areas.

The Kondo reference teaches in Figure 1, a motion vector detecting apparatus calculating the reliability of the motion vector which is detected in the plurality of areas and weighting process according to the reliability evaluation is executed to the movement vector when there is different motions inherent exist (See Col. 7, lines 53-67). The Kondo reference is evidence that one of ordinary skill in the art at the time to see more advantages the amount of the motion vectors related to the reliability evaluation data for indicating the reliability of each amount of shift in the plurality of areas so that the detection precision of the motion vector can be significantly improved and the vibration detection is optimized (See Col.8, lines 20-33). For that reason, it would have been obvious to one of ordinary skill in the art to

Art Unit: 2615

modify the image input unit of Okada ('595) by providing a reliability evaluation unit which calculates reliability data indicating the reliability of each amount of shift in the plurality of areas as taught by Kondo ('849).

Referring to claim 14, the Okada and Kondo references disclose all subject matter as discussed with respected same comments to claims 8 and 10, and wherein said judgment unit comprises a reliability evaluation unit which calculates reliability data indicating the reliability of each coincidence degree in the plurality of areas calculated by said pixel shift evaluation value calculation unit; and said pixel shift photography judgment unit judges whether the pixel shift photography has been performed normally (e.g., depend on amount of blurring), based on the coincidence degree in the plurality of areas and the reliability data as shown in Figures 13 and 18-20 (see paragraph [0108]-0109]).

Referring to claim 16, the Okada and Kondo references disclose all subject matter as discussed with respected same comments to claim 8, and the Kondo reference discloses wherein said reliability evaluation unit calculates the reliability data based on the contrast of the image within the range of each of the calculation area (e.g., judging an effective area is set to the peak center and a map having a weight coefficient distribution according to position information which occupies in the areas of each of the blocks, See Col. 7, lines 25-30 and Col. 8, lines 5-15).

Referring to claim 17, the Okada and Kondo references disclose all subject matter as discussed with respected same comments to claims 14 and 16.

Art Unit: 2615

8. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. J.P. Patent Publication 10-056595 in view of Onuki U.S. Patent Publication 2002/0097324.

Referring to claim 15, the Okada reference discloses all subject matter as discussed with respect to claim 1, except the Okada reference does not explicitly show an informing unit which informs of the judgment result of said pixel shift photography judgment unit.

The Onuki reference teaches in Figure 46, an image sensing apparatus, which performs pixel shifting operation and including an informing unit (display) which informs (warning message) of the judgment result of the pixel shift photography judgment unit (e.g., when the luring is large, a warning message is displayed when pixel shifting operation is determined, See page 29, paragraph [0054]). The Onuki reference is evidence that one of ordinary skill in the art at the time to see more advantages the image input unit including an informing unit which informs of the judgment result of said pixel shift photography judgment unit so that easily warning a user of an image not being obtained in desired resolution, or an alternative suggestion to be followed for improving resolution of the image and reducing the effect of movement of an object while performing pixel shifting (see page 3, lines 13-15 and [0031]). For that reason, it would have been obvious to one of ordinary skill in the art to modify the image input unit of Okada ('595) by providing an informing unit which informs of the judgment result of the pixel shift photography judgment unit as taught by Onuki ('324).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 2615

- a. Okada et al. U.S. 5,969,757 discloses an image inputting apparatus judging whether or not a moiré is present when performing an image shifting.
 - b. Ito et al. U.S. 6,687,386 discloses a method for detecting an object by template matching related to coincidence degree of the images.
 - c. Takeda et al. U.S. 6,734,903 discloses an image sensing apparatus performing a resolution increasing function that has no adverse effect on other functions.
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin Ye whose telephone number is (571) 272-7372. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lin Ye
Examiner
Art Unit 2615

September 2, 2005